

(54) IMAGE PICKUP DEVICE

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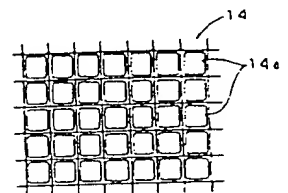
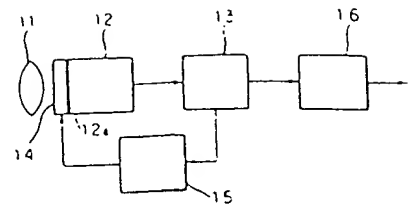
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PURPOSE: To surely obtain a normal video signal even at the time of an inverse light or the like by controlling a light shielding part having a shutter function with a video signal and providing a transmitting control part to give a shielding command at the incident position of an abnormal intensity light.

CONSTITUTION: A light shielding part 14 has many matrix-shaped micro window-shaped elements 14a to cover the whole of an image pickup surface 12a and these have individually a shutter function to be able to selectively switch the transmission of light or the shielding with an electric driving force. Thus, the transmission quantity for the arbitrary position of the image pickup surface 12a can be adjusted. A transmission light control part 15 detects the intensity of the video signal corresponding to the position of respective elements 14a of a light shielding part 14, and when it is detected that partially, an abnormally strong light is made incident on the image pickup surface 12a, the elements 14a of the corresponding position are made into a shielding condition with an electric action and the transmission of the part is stopped. A video signal correcting part 16 corrects the video signal disturbed by the shutter function of the light shielding part 14 and balanced.



12: image pickup part. 13: video signal generating part

⑨ 日本国特許庁(JP)

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⑭ 発明の名称 撮像装置

⑮ 特 願 昭63-210475

⑯ 出 願 昭63(1988)8月26日

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明 細 書

1. 発明の名称

撮像装置

2. 特許請求の範囲

光信号を集めるレンズ部と、

このレンズ部による結像位置に撮像面を有し、その撮像面に照射された光信号を電気信号に変換する撮像部と、

この撮像で得られた電気信号に基づいて映像信号を生成する映像信号生成部と、

前記撮像面のレンズ部側に設けられ、その撮像面の任意位置への光の透過と遮断とを選択的に切り換えるシャッター機能を有する光遮断部と、

前記映像信号生成部からの映像信号を受け、前記撮像面への異常強度光の入射を検出した場合に前記光遮断部に制御信号を出力し、異常強度光の入射位置への光の遮断指令を与える透過光制御部と、

透過光制御後の前記映像信号生成部からの映像信号を受け、その映像信号の補正を行う映像信号

補正部

とを備えたことを特徴とする撮像装置。

3. 発明の詳細な説明

(産業上の利用分野)

本発明は光信号を電気信号に変換した後、映像信号として取り出す撮像装置に係わり、特に逆光等の異常強度光の入射対策を施した撮像装置に関する。

(従来の技術)

第3図にこの種の撮像装置の基本的構成例を示す。光信号を集めるレンズ部1と、このレンズ部1による結像位置に撮像面2aを有し、その撮像面2aに照射された光信号を電気信号に変換する撮像部2と、この撮像部2で得られた電気信号に基づいて映像信号を生成する映像信号生成部3とが備えられている。

このような撮像装置において、レンズ部1内にしほり機構が設けられ、レンズ部1に入射した光はしほり機構によって光量を調節され、撮像部2の撮像面2aに像を結ぶようになっている。

(発明が解決しようとする課題)

ところで、逆光のように部分的に強度の大きい光が入射された場合、撮像面 2 a には明度差の大きい像が作り出されるが、しほり機構のみで光量を調節する従来の装置では、正常な映像信号が得にくい。例えば明度の大きい部分を基準にすると、明度の小さい部分では光量不足となり全体像が暗くなる。また、明度の小さい部分を基準にすると、明度の大きい部分で光量が強くなり過ぎ、その周辺部分がぼやけたり、撮像面が破損したりする。

本発明はこのような事情に鑑みなされたもので、逆光等のように部分的に強い光を含む場合であっても、正常な映像信号を確実に得ることができる撮像装置を提供することを目的とする。

(課題を解決するための手段)

本発明は光信号を結像させるための撮像面の前方に、その撮像面の任意位置への光の透過と遮蔽とを選択的に切り換えるシャッタ機能を有する光遮蔽部を設けるとともに、その光遮蔽部を映像信号に基づいて制御し、異常強度光の入射位置での

光の遮蔽指令を与える透過光制御部を設け、更に透過光制御部の映像信号を補正する映像信号補正部を設けた構成とし、これにより部分的に強い光を含む場合であっても、その強い光の入射を阻止して正常な映像信号を確実に得られるようにして、前記の目的を達成するものである。

(実施例)

以下、本発明の一実施例を第 1 図および第 2 図を参照して説明する。

第 1 図は撮像装置の全体構成を示す機能ブロック図である。この装置でも光信号を集めるレンズ部 1 1 と、レンズ部 1 1 による結像位置に撮像面 1 2 a を有し、その撮像面に照射された光信号を電気信号に変換する撮像部 1 2 と、この撮像部 1 2 で得られた電気信号に基づいて映像信号を生成する映像生成部 1 3 とが備えられている。このものにおいて、撮像面 1 2 a のレンズ部 1 1 側に光遮蔽部 1 4 が設けられている。

第 2 図は光遮蔽部 1 4 を拡大して光軸方向から見た形状を示している。すなわち、光遮蔽部 1 4

は撮像面 1 2 a 全体を覆う多数のマトリックス状の微細窓状の要素 1 4 a を有するものとされており、各要素 1 4 a は個々に電気的駆動力で光の透過または遮蔽の選択的切り換えが可能なシャッタ機能を有するものとされている。これにより、撮像面 1 2 a の任意位置に対する透光量を調節することが可能となっている。

そして、第 1 図に示すように、映像信号生成部 1 3 からの映像信号を受け、光遮蔽部 1 4 に制御信号を出力する透過光制御部 1 5 が設けられている。この透過光制御部 1 5 は、光遮蔽部 1 4 の各要素 1 4 a の位置に対応して映像信号の強弱を検出するようになっており、撮像面 1 2 a に部分的に異常に強い光が入射したことを検出した場合には、対応する位置の要素 1 4 a を電気的動作で遮蔽状態とし、その部分の透光を阻止する遮蔽指令を与えるものである。

また、映像信号生成部 1 3 には映像信号補正部 1 6 が接続されている。この映像信号補正部 1 6 は、光遮蔽部 1 4 による透過量制御後に映像信号

を受け、光遮蔽部 1 4 のシャッタ機能により乱れた映像信号を補正して、バランスのとれた映像信号とするものである。

このような実施例の撮像装置によると、逆光のごとく部分的に著しく強い明度の光がレンズ部 1 2 に入射された場合、映像信号生成部 1 3 からの映像信号に基づいて、著しく強い光が照射されている撮像面 1 2 a 上の位置および強度が透過光制御部 1 5 によって検出される。そして、検出された光の強度が設定レベル以上である場合、透過光制御部 1 5 から光遮蔽部 1 4 に制御信号が出力され、その光の照射されている撮像面 1 2 a の位置に対応する要素 1 4 a のシャッタ機能により、光の透過が阻止され、これにより透光量が調節され、撮像面 1 2 a に照射される光の量が一定レベル内となるように制御される。そして、撮像部 1 2 から出力された電気信号に基づいて、映像信号生成部 1 3 で明度差の適正な映像信号が生成され、その映像信号が映像信号補正部 1 6 でバランスのとれた映像信号に補正されるものである。

したがって、撮像面12aに照射される光の強さが任意の位置で制御可能となり、逆光等の若しく明度差の大きい光が入射された場合でも、異常強度の影響が排除され、適正な映像信号が確実に得られるようになる。また、逆光のごとく若しく強い光による撮像面の破損等も効果的に防止できる。

〔発明の効果〕

以上のように、本発明に係わる撮像装置によると、逆光等のように部分的に強い光を含む場合であっても、正常な映像信号が確実に得られるとともに、撮像面の破損防止が図れる等の優れた効果が奏される。

4. 図面の簡単な説明

第1図は本発明に係わる撮像装置の一実施例を示す機能ブロック図、第2図は第1図に示す光遮蔽部を拡大して光軸方向から示す図、第3図は従来例を示す機能ブロック図である。

- 11 ……レンズ部、12 ……撮像部、
12a ……撮像面、

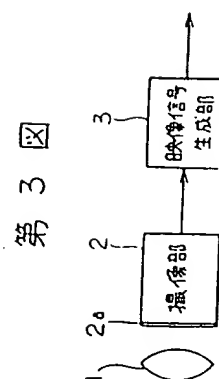
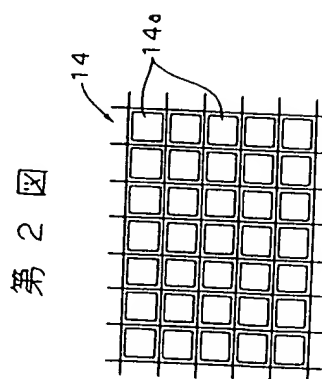
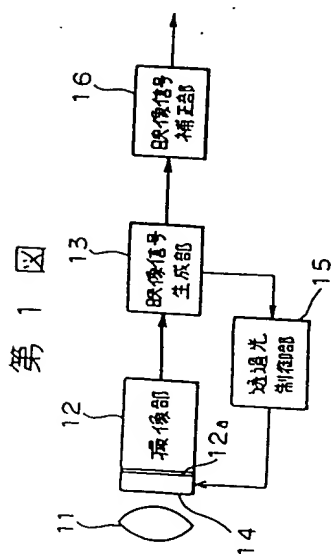
- 13 ……映像信号生成部、14 ……光遮蔽
15 ……透過光制御部、
16 ……映像信号補正部。

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Image Pickup Device

[Satsuzo sochi]

UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. JULY 1996
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JAPANESE PATENT OFFICE

PATENT JOURNAL

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IMAGE PICKUP DEVICE

[Satsuzo sochi]

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[There are no amendments to this patent.]

Claim

/1*

A type of image pickup device having the following units:
lens unit for collecting the optical signal; an image pickup unit, which has an image pickup plane at the imaging position of this lens unit, and which can convert the optical signal irradiated on the image pickup plane to an electric signal;

a video signal generating unit which generates a video signal from the electric signal obtained by the image pickup [unit];

a light blocking unit, which is set on the lens unit side of the aforementioned image pickup plane, and has a shutter function for selectively transmitting or blocking the light to any position on the aforementioned image pickup plane;

a transmitted light control unit, which receives the video signal from the aforementioned video signal generating unit, and when incidence of light of abnormally high intensity is detected, outputs a control signal to the aforementioned light blocking unit and issues a command to block the light for the incident position of the light of abnormally high intensity;

and a video signal correction unit, which receives the video signal from the aforementioned video signal generating unit after

* Numbers in the margin indicate pagination in the foreign text.

control on the transmitted light and performs correction of the video signal.

Detailed explanation of the invention

Industrial application field

This invention pertains to a type of image pickup device which converts an optical signal to an electric signal, then outputs the electric signal as a video signal. More specifically, this invention pertains to a type of image pickup device with measures taken against incidence of back light or other light of abnormally high intensity.

Prior art

Figure 3 is a diagram illustrating an example of the basic configuration of this type of image pickup device. It has lens unit (1) for collecting light, image pickup plane (2a) set at the imaging position of said lens unit (1), image pickup unit (2) for converting the optical signal irradiated on said image pickup plane (2a) to an electric signal, and video signal generating unit (3) for forming a video signal based on the electric signal obtained by said image pickup unit (2).

In this image pickup device, a diaphragm mechanism is arranged inside lens unit (1), so that the intensity of the light incident on lens unit (1) is adjusted by the diaphragm mechanism, as an image is formed on image pickup plane (2a) of image pickup unit (2).

Problems to be solved by the invention

/2

However, in the case of back light or other cases when light of abnormally high intensity is incident at certain portions, an image with a large difference in luminosity is formed on image pickup plane (2a). In this case, in the conventional device that only adjusts amount of light with a diaphragm mechanism, it is difficult to form normal video signal. For example, when the portion with high luminosity is taken as the reference, the amount of light is not sufficient in the portion with low luminosity, so the entire image becomes dark. On the other hand, when the portion with low luminosity is taken as the reference, the amounts of light is excessive in the portion with high luminosity so the peripheral portion becomes blurred, and the image pickup plane may be damaged.

The purpose of this invention is to solve the problems of the aforementioned conventional scheme by providing a type of image pickup device which is able to form a normal video signal reliably even when light of abnormally high intensity is included as a portion of the incident light, such as in the case of back light, etc.

Means for solving the problems

In order to realize the aforementioned purpose, in this invention, a light blocking unit is set in front of the image pickup plane for picking up with the optical signal, and it has a shutter function for selectively transmitting or blocking the light to blocking any position on the aforementioned image pickup plane; also, there is a transmitted light control unit, which

controls the light blocking unit based on the video signal, and which issues a command to block the light for the incident position of the light of abnormally high intensity; also, a video signal correction unit for correcting the video signal after the transmitted light is controlled; in this way, even when apportion with light of abnormally high intensities included, incidence of the light of abnormally high intensity can be obstructed, and a normal video signal can be obtained reliably.

Application Example

In the following, this invention will be explained in more detail with reference to an application example illustrated by Figures 1 and 2.

Figure 1 is a functional block diagram illustrating the overall configuration of the image pickup device. This device has the following parts: lens unit (11) for collecting the optical signal; image pickup unit (12), which has image pickup plane (12a) at the imaging position of lens unit (11), and which converts the light signal irradiated on the image pickup plane to an electric signal; and video signal generating unit (13) which generates a video signal based on the electric signal obtained by image pickup unit (12). In this device, light blocking unit (14) is set on the lens unit (11) side of image pickup plane (12a).

Figure 2 is a diagram illustrating an enlarged shape of light blocking unit (14) viewed in the direction of the optical axis. That is, light blocking unit (14) has plural matrix-shaped fine window-like elements (14a) that cover the entire image pickup plane (12a), with each element (14a) having an individual shuttering function that enables selective transmission or

blocking of light with an electric driving force. In this way, it is possible to adjust the amount of light transmitted to any position on image pickup plane (12a).

As shown in Figure 1, there is a transmitted light control unit (15), which receives the video signal from video signal generating unit (13), and outputs a control signal to light blocking unit (14). This transmitted light control unit (15) can detect the intensity of the video signal corresponding to the position of each element (14a) of light blocking unit (14). When light of abnormally high intensity incident on some portion of image pickup plane (12a) is detected, the elements (14a) at the corresponding position are changed to a blocked state by means of an electric operation, as the control unit issues a blocking command [sic] to abstract the aforementioned portion of light of abnormally high intensity.

Also, video signal correction unit (16) is connected to video signal generating unit (13). After control of the amount of light transmitted by light blocking unit (14), the video signal is received by said video signal correction unit (16), and the video signal that has been disturbed by the shutter function of light blocking unit (14) is corrected to form a video signal with good balance.

When the image pickup device of this application example of the invention is used, as back light or other light of abnormally high intensity is incident in some portion on lens unit (12), based on the video signal from video signal generating unit (13), the position and intensity of the incident light of abnormally high intensity on image pickup plane (12a) are detected by transmitted light control unit (15). Then, when the intensity of light that is detected is higher than a preset level, a control

signal is output from transmitted light control unit (15) to light blocking unit (14), so that [for] elements (14a) corresponding to the position on image pickup plane (12a) irradiated by said light of abnormally high intensity, transmission of the light of abnormally high intensity is obstructed by means of the shutter function. In this way, the amount of light transmitted is adjusted, and the intensity of the light incident on image pickup plane (12a) can be controlled to within a prescribed level. Then, based on the electric signal output from image pickup unit (12), a video signal with an appropriate luminosity difference is formed at video signal generating unit (13). This video signal is then corrected to a video signal with good balance by video signal correction unit (16).

Consequently, it becomes possible to control the /3 intensity of the light irradiated on image pickup plane (12a) at any position. Even when back light or other light of excessively high luminosity difference is incident, it is still possible to eliminate the influence of the light of abnormally high intensity, and to form an appropriate video signal reliably. Also, it is possible to effectively prevent any damage, etc., of the image pickup plane due to the back light or other light of abnormally high intensity.

Effect of the invention

As explained above, using the image pickup device of this invention, even when the incident light includes a portion comprised of back light or other light of abnormally high

intensity, it is still possible to prevent damage to the image pickup plane, which is an excellent effect of this invention.

Brief description of figures

Figure 1 is a functional block diagram illustrating an application example of the image pickup device of this invention. Figure 2 is an enlarged diagram of the details of the light blocking unit in Figure 1. Figure 3 is a functional block diagram illustrating a conventional example.

- 11 Lens unit
- 12 Image pickup unit
- 12a Image pickup plane
- 13 Video signal generating unit
- 14 Light blocking unit
- 15 Transmitted light control unit
- 16 Video signal correction unit

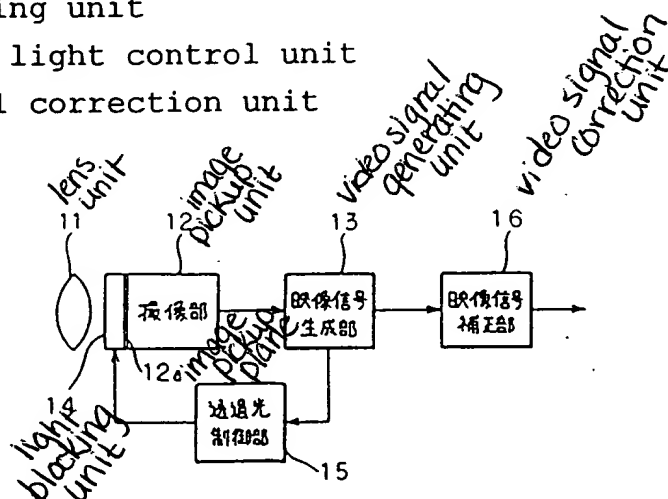


Figure 1

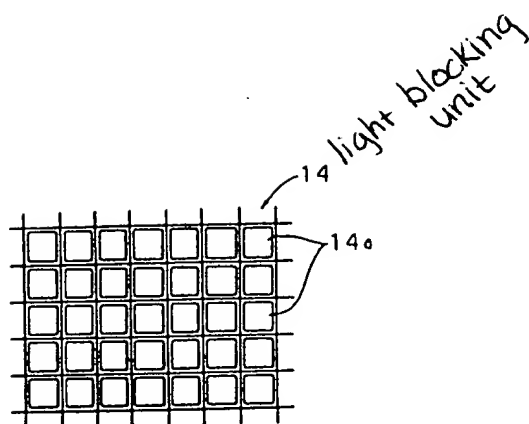


Figure 2

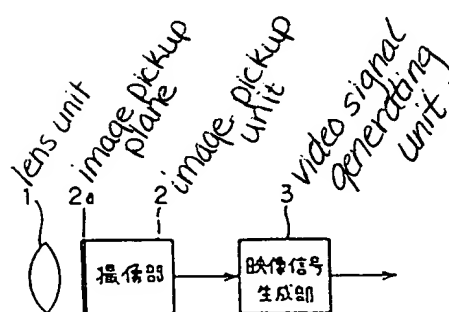


Figure 3.

Key: 2 Image pickup unit
 3 Video signal generating unit

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